METALLOTHIONEIN AND GLUTATHIONE IN LYMNAEA STAGNALIS DETERMINE THE SPECIFICITY OF RESPONSES ON THE EFFECTS OF IONISING RADIATION

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Aquatic pulmonate mollusks are potential bioindicative species. Therefore the aim of our study was to elucidate the specificity of their response on the long-term and acute effects of radiation in comparison with the responses to other environmental impacts. For that, pulmonate mollusk *Lymnaea stagnalis* from three feral populations (from radioactively polluted for long time area (group R, 14 km from the Chernobyl nuclear power plant), cooling pond (group T), and cooling channel (group C) of hydropower plant) and after the exposure to ionizing radiation (group RL, 7 days before study, the snails were given 2 mGy X-ray radiation over the body) or elevated temperature (group TL, exposure to 25° C during 4 days) were studied. The mortality of snails in the laboratory conditions was 40% in group RL and 75% in group TL. Control snails (CL) were adapted to laboratory conditions. The experimental results revealed similarities and dissimilarities among the responses of different biomarkers on the effect of radiation and warming and also on the effect of field and laboratory conditions. Among different biomarkers of stress and exposure in the digestive gland of snails, only the state of cellular thiols, GSH and metallothioneins (MT), allow to distinguish the groups affected by radiation from other groups. These groups (particularly the group R) had high levels of GSH, glutathione S-transferase activity and low level of MT. Beside the peculiarities of the effect of radiation, other field groups (R, T, C) were separated from the laboratory groups (RL, TL, CL) by low activities of lactate dehydrogenase and high activities of cholinesterase and catalase combined with the high level of lipid peroxidation measured by the concentration of TBARS. Superoxide dismutase activities were similar in all groups. In all exposed groups for exception of the group TL, decreased concentrations of protein carbonyls were shown, reflecting probably fast turnover and degradation of oxidized proteins in the tissues. In conclusion, GSH and MT in snails give reliable responses as biomarkers for radiation effect and adaptation in risk assessment.

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